UNITED STATES PATENT AND TRADEMARK OFFICE

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10/749,745	12/30/2003	Ho Sang Sung·	2013P147	9028

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2003*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☒ All   b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Specification

1.   The disclosure is objected to because of the following informalities:

On Page 7, Lines 12-15, it appears that the terms "pyramid vector quantizer PVQ1" and

"non-structural vector quantizer VQ2" have been transposed *(see Fig. 3- series connection*

occurs between VQ1 and PVQ1 and also occurs between VQ2 and PVQ2). Appropriate

correction is required.

Claim Objections

2.   **Claims 1-6** are objected to because of the following informalities:

In claim 1, lines 11-12, "candidate vector" should be changed to --second candidate

vector-- in order to clarify the claim and prevent confusion between the "candidate vector"

generated in the prediction structure quantizer *(see line 4)* and the "candidate vector" generated

in the non-prediction structure quantizer.

In claim 1, line 14, "one having" should be changed to --one quantization vector having--

in order to clarify the language of the claim.

Dependent claims 2-6 fail to overcome the objections directed to claim 1, and thus, are

also objected due to minor informalities.

Appropriate correction is required. ,

Claim Rejections - 35 USC § 101

3.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4.   **Claims 1-6** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 1 is directed to a vector quantizer that performs a process of manipulating abstract data vectors with a prediction structure and non-prediction structure and thereafter performs another mathematical function to select a final abstract quantization vector. If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Benson, 409 U.S. at 71-72, 175 USPQ at 676. Thus, a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.

Also, this claimed process does not generate a "useful, concrete, and tangible result" because the final result of the claimed invention is an abstract data vector that is not output to a user or transmitted, for example. The claimed invention is also not directed to a practical application because no claimed real-world signal (i.e., speech or voice) is being processed. The claimed invention as a whole must be useful and accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02. Since claim 1 does not produce such a result, it is directed to non-statutory subject matter.

Claims 2-6 fail to overcome the non-statutory subject matter issues directed to claim 1,

and thus, are also directed to non-statutory subject matter by virtue of their dependency.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

6.   **Claims 1-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chi et al

("Safety-net Pyramid VQ of LSF Parameters for Wideband Speech Codecs," 2001) in view of

Pan *("Extension of Two-Stage Vector Quantization-Lattice Vector Quantization," 1997)*.

With respect to **Claim 1**, Chi discloses:

A prediction structure quantizer that comprises a predictor which calculates a predicted

line spectral frequency vector of the line spectral frequency coefficient vector *(AR predictor,*

Page 724, col. 2 –725, col. 1; and Fig. 1), and a first lattice quantizer which lattice-quantizes a

LSF vector with reference to the predicted line spectral frequency vector to calculate a final

prediction quantization vector of the line spectral frequency coefficient vector *(predictive*

pyramid VQ that calculates a prediction quantized LSF vector, Page 724, col. 2- 725, col. 1; and

Figs. 1 and 2, PPVQ);

A non-prediction structure quantizer that comprises a second lattice quantizer which

lattice-quantizes a LSF vector to calculate a final non-prediction quantization vector of the line

spectral frequency coefficient vector *(memory-less pyramid vector quantization that directly quantizes an LSF vector, Page 725; and Fig. 2)*; and

A switch that determines one having a small difference from the line spectral frequency coefficient vector, from the final prediction quantization vector and the final non-prediction quantization vector, as a final quantization vector of the line spectral frequency coefficient vector *(selector that chooses a best quantized LSF vector from either the PPVQ or memory less PVQ based on a difference from the input LSF vector, Page 725; and Fig. 2)*.

Although Chi discloses a vector quantizer system that is similar in parallel structure to the claimed invention, Chi does not teach that the quantizers are two-stage in that they utilize an unstructured codebook in series with the pyramidal vector quantizers. Pan, however discloses such a two-stage quantization scheme, wherein a quantization output from an unstructured codebook stage is input to a pyramidal lattice VQ *(Pages 1542-1543, Sections III.A and B)*.

Chi and Pan are analogous art because they are from a similar field of endeavor in speech vector quantization systems. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Chi with the two stage quantization scheme taught by Pan in order to reduce codebook search and storage complexity while improving distortion performance *(Pan, Section 1, Page 1538 and Section 5, page 1547)*.

With respect to **Claim 2**, Chi further discloses:

The prediction structure quantizer and the non-prediction structure quantizer are connected in parallel to quantize the line spectral frequency coefficient vector *(PPVQ and memory-less PVQ in parallel, Fig. 2)*.

With respect to **Claims 3/1, 3/2/1, 4/1, and 4/2/1**, Chi discloses the VQ structure having

predictive and memory-less vector quantizers in parallel *(Fig. 2)*, while Pan discloses a vector

quantizer comprising two stages connected in series *(unstructured and pyramidal lattice vector*

quantizers connected in series, Fig. 5).

With respect to **Claims 5 and 6**, Chi discloses that the first and second lattice quantizers

are pyramid vector quantizers *(PPVQ and memory-less PVQ, Fig. 2)*.

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure:

Kroon *(U.S. Patent: 5,664,055)*- discloses a speech coding utilizing a two-stage vector

quantizer.

Servetto et al *(U.S. Patent: 6,516,297)*- discloses a method for lattice vector

quantization.

Das et al *(U.S. Patent: 6,820,052)*- discloses a method for encoding speech using

pyramid vector quantization.

Kim et al *(U.S. Patent: 6,988,067)*- discloses an LSF quantizer for wideband speech

utilizing two pyramid vector quantizers in parallel.

Pan *("Two-Stage Vector Quantization-Pyramidal Lattice Vector Quantization and*

Application to Speech LSP Coding," 1996)- discloses a two-stage vector quantization-pyramidal
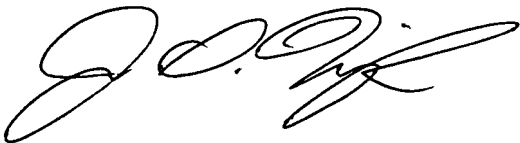
lattice vector quantization that has low computational requirement and superior encoding performance.

Cho et al *("Predictive Pyramid Vector Quantization of LSF Parameters," 1998)*- discloses a method of quantizing LSF parameters using predictive pyramid vector quantization.

8.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached at (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James S. Wozniak
9/13/2007